UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

FEB 09 1999

REF: 4WM-GWDW

Mr. Samuel E. Poole
Executive Director
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33416

Dear Mr. Poole:

Thank you for your October 1, 1998, letter to Environmental Protection Agency (EPA) Administrator Carol M. Browner. I am providing you with a response to your request of written confirmation of the Agency's policy regarding the use of "raw" surface and ground water in aquifer storage and retrieval (ASR) wells proposed for the Central and Southern Florida Project Comprehensive Review Study (Restudy). Under the Safe Drinking Water Act (SDWA) and federal regulations, these wells would be classified as Class V underground injection wells regulated by the Underground Injection Control (UIC) program. The State has primary enforcement authority for these wells, but in any case, injection into any Class V wells must not endanger underground sources of drinking water (USDWs).

The issue of implementing ASR well technology using untreated surface or shallow ground waters as source water has been challenging. We have focused a great deal of attention on this issue at the Regional level, and at EPA Headquarters offices. We have also worked closely with the Florida Department of Environmental Protection (FDEP) as our partner in the Underground Injection Control program and will continue to solicit their support.

ASR technology has the potential for great environmental benefit in solving water use problems in south Florida, but we believe that the potential may also exist for this technology to cause undesirable contamination of aquifers, which might be used as drinking water supplies for the region. EPA is aware that recapturing lost water storage capacity is a key element in the overall south Florida ecosystem restoration effort. Even so, it is imperative that implementation of this technology not cause contamination of USDWs that could adversely affect the health of persons now or in the future.

The Restudy currently proposes to use ASR technology to provide up to 1.7 billion gallons per day of water storage capacity. The source of most of the water to be stored is untreated surface waters or shallow ground waters. This raises a potential concern because the SDWA and the federal UIC regulations prohibit injection activity which allows the movement of

fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR Part 142 or may otherwise adversely affect the health of persons [42 U.S.C.§300h(d)(2); 40 CFR §144.12(a)]. Most surface waters, and some shallow ground waters, cannot comply with this requirement due to the presence of various contaminants. A review, however, of the somewhat limited water quality data available for the proposed source waters (Lake Okeechobee and the Caloosahatchee River) indicates that there may be only one contaminant present which exceeds the primary drinking water maximum contaminant levels (MCLs): total coliform bacteria.

Because of the importance of identifying effective ways to store water in the region, EPA has indicated in meetings with involved stakeholders that we are willing to consider a flexible approach to constructing and permitting the ASR wells proposed by the Restudy. For those wells, EPA believes that the proposed "raw" water ASR projects can be implemented consistent with the SDWA and EPA's regulations if "risk-based" analyses of the projects demonstrate that the USDW will not be endangered in a way that could adversely affect the health of humans. This approach would depend on a number of factors: (1) that a more comprehensive evaluation of the quality of the proposed source waters confirms that total coliform bacteria is the only problematic parameter; (2) that a demonstration can be made that the biological contaminants will experience "die-off" such that the presence of these contaminants in the USDW will not cause a violation of the MCL or pose an adverse health risk; (3) that both modeling and test monitoring confirm die-off after injection of the biological contaminants within a reasonable time-space continuum after injection into a saline/brackish aquifer; (4) that the use of ASR technology on the scale and with the number of wells proposed, results in recovery of a reasonable amount of injected waters and of reasonable quality; (5) that there are documented environmental benefits to be derived by the storing of water in this manner; and (6) that use, and treatment if necessary, of the recovered water is consistent with its intended primary purpose, i.e., for ecosystem restoration.

We have all come to recognize the complexity of the concerns involving raw water ASR implementation and the probability that additional concerns will also arise. Indeed, some concerns may not become known until actual project initiation. If these current and future concerns are to be addressed adequately so as to not threaten public health, then the appropriate pilot projects and "risk-based" strategies will need to be developed, carried out and carefully evaluated. For example, if monitoring clearly demonstrates that total coliform bacteria is the only contaminant of concern, then a "risk-based" analysis must demonstrate that coliform bacteria in the injectate will not impact any portion of the public currently using that aquifer or any surrounding aquifer as a source of water supply, as well as that no bacteria will survive long enough to pose risks down-gradient or in the future.

Other than for coliform bacteria, the proposed raw water injectate should be evaluated to determine if other contaminants are present that exceed MCLs for drinking water, or may otherwise adversely affect the health of persons. Appropriate water quality monitoring of both the source water and the injection zone should be instituted both to characterize the quality of

those waters and to ensure that no USDWs are endangered.

In addition to monitoring the quality of water that is injected, appropriate water quality monitoring for contaminants that may form within the injection zone as a result of the injection activity should also be conducted. For example, it is conceivable the injection of oxygenated waters could cause the dissolution of uranium isotopes, if present, from the injection zone which would cause a threat to the USDW. Likewise, oxygenated waters could potentially sustain bacterial survival in the receiving USDW. Other potentially harmful effects from injection activity include the conversion of organic nitrogen to ammonium nitrogen, the methylization of mercury, and the formation of trihalomethanes should chlorination be utilized. Any proposed raw water ASR project should address these and other concerns that may arise.

As a general matter, the injection zone for any proposed raw water ASR project should already contain water that is of lesser quality than the proposed raw water injectate. For example, it may be acceptable to inject fresh water from Lake Okeechobee containing coliform colonies that will die off in the brackish water of the Floridan Aquifer in the region. But the same quality of raw water could not be injected into the fresh water of the Floridan Aquifer in northern or central Florida. In other words, the proposed injection activity for the ASR project should not cause a current or future public water system to need more treatment to meet drinking water standards than would be necessary using the native waters of the injection zone aquifer.

EPA believes that such large scale, untreated water ASR projects should be developed incrementally. Initial implementation should begin with pilot testing. If this testing indicates initial success with very low risk, then the project could be expanded in stages with each subsequent stage demonstrating the potential environmental benefit of ASR technology. It is critical that a favorable percentage of injected water be recoverable so that implementation of ASR technology provides a direct environmental benefit that is more advantageous than alternative water storage mechanisms. Also, the incremental implementation of ASR should closely monitor the rates and volumes of injected fluids, the wellhead injection pressure, and the pressure build-up within the injection zone. Injection pressure and/or pressure build-up within the injection zone must not cause fracturing of the overlying geologic unit so as to allow the injectate or formation fluids from the injection zone to migrate upward into zones with higher quality water, such as the Biscayne Aquifer.

If all of these factors/conditions are satisfied, we believe that EPA, and the FDEP, can determine for this specific project that ASR injection is allowable under the SDWA without the requirement for sophisticated treatment of the raw water prior to injection. However, even if this decision is made, it may be necessary for FDEP to promulgate amended State rules to allow for injection of this type which does not meet drinking water standards at the point of injection. If any factor is not satisfied, the result may be that the proposed ASR cannot proceed without prior treatment of the injectate.

It is my understanding that an ASR Issue Team, co-chaired by Richard Harvey, Director of EPA Region 4, South Florida Office, has been created by the South Florida Ecosystem Restoration Task Force/Working Group to address the issues and concerns discussed above. I would like to encourage you to continue working with Richard and the other members of the Issue Team to resolve these concerns as expeditiously as possible and to develop an appropriate "risk-based" strategy. As always, EPA looks forward to working with you on these and other critical ecosystem restoration issues facing south Florida. If I may be of further assistance, please feel free to contact me.

Sincerely,

John H. Hankinson, Jr.
Regional Administrator

cc: Task Force Members
Working Group Members
Mimi Drew, FDEP
ASR Issue Team Members
Dana Minerva, OW
Cynthia Daugherty, OGWDW